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ABSTRACT

An essential first step in the investigation of employment discrimination is establishing that the selection procedure has had an adverse impact. The 80% rule and statistical significance (as determined with a chi-square test), two methods of assessing adverse impact, were compared considering the variables: number of applicants (N), proportion of applicant pool who are minorities, majority group selection ratio, and minority group selection ratio. Data analyses indicated relatively few conditions where the two methods led to the same conclusion. Problems found with the 80% rule were: (1) under common conditions adverse impact may be concluded when chance differences between majority and minority selection ratios have occurred; and (2) the 80% rule is sensitive solely to variations in majority group selection ratio. Problems found with the chi-square were that with lower values of N, majority selection ratio and proportion minority, statistically significant chi-squares cannot be obtained; at high values of N, majority selection ratio and proportion minority, trivial differences in selection ratios may result in statistical significance. The findings suggest that more attention needs to be focused on choosing an appropriate assessment of adverse impact. (Twelve tables of statistical data are included.) (Author/JAC)

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Problems in Assessing Adverse Impact:
80% Rule and Statistical Significance¹

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Abstract

An essential first step in the investigation of employment discrimination is establishing that the selection procedure has had an adverse impact. The 80% rule and statistical significance (as determined with a chi-square test) are methods of assessing adverse impact. These two methods were compared, and problems with each were discussed considering the following variables: number of applicants (N), proportion of applicant pool who are minorities, the majority group selection ratio, and the minority group selection ratio. Data analyses indicated relatively few conditions where the two methods led to the same conclusion. Two problems noted with the 80% rule were: (1) under common conditions adverse impact may be concluded when chance differences between majority and minority selection ratios have occurred; (2) the 80% rule is sensitive solely to variations in majority group selection ratio. Two problems noted with chi-square were: (1) with lower values of N, majority selection ratio and proportion minority, statistically significant chi-squares cannot be obtained; (2) at high values of N, majority selection ratio, and proportion minority, trivial differences in selection ratios may result in statistical significance. These problems were discussed, and suggestions offered.

Problems in Assessing Adverse Impact:

80% Rule and Statistical Significance

Title VII of the Civil Rights Act of 1964 and Executive Order 11246 prohibit the use of selection procedures which discriminate on the basis of race, color, religion, sex or national origin in any employment decision. The Uniform Guidelines on Employee Selection Procedures (EEOC et al., 1978) were designed to provide a framework for determining the acceptable use of selection procedures, and are applied by the appropriate government agencies in their enforcement of the law and regulations noted above. The provisions of the Uniform Guidelines, are intended to be used by employers in determining whether a particular selection procedure is being used in a discriminatory and thus prohibited manner.

An essential first step in an investigation of discrimination in an employment decision is establishing that the selection procedure has had an adverse impact. Section 16B of the Uniform Guidelines defines adverse impact as, "a substantially different rate of selection in hiring, promotion, or other employment decision which works to the disadvantage of members of a race, sex, or ethnic group" (EEOC et al., 1978, p. 38307).

According to Section 3 of the Uniform Guidelines, a "procedure having adverse impact constitutes discrimination unless justified" (EEOC et al., 1978, p. 38297). Section 3A states:

The use of any selection procedure which has an adverse impact on the hiring, promotion, or other employment or membership opportunities of members of any race, sex, or ethnic group will be considered to be discriminatory and inconsistent with these guidelines, unless the procedure has been validated in accordance with these guidelines (p. 38297).

Section 1B of the Uniform Guidelines points out that, "these guidelines do not require a user to conduct validity studies of selection procedures where no adverse impact results" (p. 38296).

It has been well established that the plaintiff charging discrimination must bear the initial burden of establishing a prima facie case by showing that the procedures in question have an adverse impact on members of a race, sex, or ethnic group (Arvey, 1979). If the plaintiff is successful in showing the adverse impact of a procedure, the burden of proof shifts to the defendant who must rebut by justifying the procedure, usually by establishing its validity (e.g., Albemarle Paper Co. v. Moody, 1975; Dothard v. Rawlinson, 1977; McDonnell Douglas Corp. v. Houghty, 1977; Teamsters v. United States, 1977).

The importance of a clear, reasonable definition of the term "adverse impact" and a method for the unambiguous assessment of the condition is obvious. Although the term "adverse impact" appears to be defined in a clear and reasonable manner in Section 16B of the Uniform Guidelines, ambiguity has resulted when operationally defining the term "substantially different rate of selection." Unfortunately, two different operational definitions have surfaced which involve two different methods of assessing adverse impact. Both methods use the comparison of the selection ratio (Sk) of the minority and majority groups, but have disparate criteria for determining whether any difference between the selection ratios is substantial enough to indicate adverse impact.

One operational definition, called the 80% rule, involves calculating the ratio of the smaller SR (usually that of the minority group) to the larger SR (usually that of the majority group). If this ratio, which

will be referred to as the Adverse Impact Ratio (AIR), is less than .80, it will "generally be regarded by the Federal enforcement agencies as evidence of adverse impact" (EEOC et al., 1978, p. 38297). The second operational definition, statistical significance, involves using a statistical test to determine whether "a differential pass rate for two or more groups arises from a real difference in the performance of the groups or from random differences arising from chance variation in the sample" (Barrett in Jones v. New York City Human Resources Admin., 1975, p. 6752). Based on a sample of applicant flow data from a given time period, a test of statistical significance would be used to imply whether the organization has shown a pattern or practice of adverse impact in past selection decisions.

The Federal enforcement agencies seem to prefer the 80% rule (EEOC, 1979). They describe it as a "rule of thumb" (EEOC et al., 1978, p. 38294; EEOC, 1979, p. 2253-11). A few situations have been noted by the agencies where the 80% rule may be inappropriate and statistical significance should be considered. One situation is where the number of selection decisions is large and the resulting AIR is greater than .80, but the difference in SR's is statistically significant (EEOC, 1979). The second situation is where the differences are based on small numbers and are not statistically significant (EEOC et al., 1978, p. 38297; EEOC, 1979, p. 2253-11). In a series of "Questions and Answers" published in the Federal Register and intended to clarify the Uniform Guidelines, Question 20 offers the following as an example of the second situation: the selection of three males and one female from an applicant pool of 20 males and 10 females (EEOC, 1979, p. 2253-11). No more precise

guidelines defining the "large number" or "small number" which would make the 80% rule inappropriate have been offered.

In general, the courts seem to have relied on statistical significance for the determination of adverse impact (*Castenada v. Partida*, 1977; *Chance v. Board of Examiners*, 1972; *Hazelwood School District v. United States*, 1977; *Jones v. New York City Human Resources Admin.*, 1975; *Teamsters v. United States*, 1977; *Vulcan Society Fire Department, Inc. v. Civil Service of the City of New York*, 1973). In at least one case, a claim that a test resulted in an adverse impact was rejected (even though the AIR was .59 and $N = 201$) because the results were not statistically significant (*Bridgeport Guardians, Inc. v. Bridgeport Civil Service Commission*, 1973).

Some limited comparisons of the 80% rule and statistical significance as definitions of adverse impact have been made (Boardman, 1979; Greenberg, 1979). These comparisons have considered the probabilities of type I and type II errors using the 80% rule for a limited number of group sizes where population SRs are known. These studies indicate that there are many situations in which the results of the two methods do not agree. As noted above, the Federal agencies have not precisely specified the conditions under which they feel each method is appropriate, but both the Uniform Guidelines and associated explanations indicate that they view the major determinant as number of applicants or number selected.

The purposes of this paper are to compare the two methods of defining adverse impact considering all of the variables which will affect that comparison, and to assess the problems associated with each method. The variables considered are: the number of applicants, the proportion of

the applicant pool who are minorities, the majority group selection ratio, and the minority group selection ratio. The two methods are compared in various situations which are defined by combinations of these variables.

Method

Majority Selection Ratio

Majority selection ratio (MajSR) is simply the proportion of majority applicants hired. The two methods of defining adverse impact were compared at a majority selection ratio of .05 and at values ranging from .10 to .90 in increments of .10. Although selection ratios between .10 and .40 are most common (BNA, Daily Labor Report, April 6, 1978), a wide range of majority selection ratios was used to demonstrate how the two rules compared under extreme conditions, as well as more common conditions.

Number of Applicants

Sample size (N) represents the number of applicants in an applicant pool. No literature pertaining to typical number of applicants was found. However, Lent, Aurbach and Levin (1971) in a review of 406 published validity studies reported that the median sample size of these studies was 68. While the sample size in a validity study does not necessarily correspond to the number of applicants in the applicant pool, it can be used to obtain a rough estimate of the number of applicants in an applicant pool. Since majority selection ratios ranging from .10 to .40 are of primary interest, .40 was used as the upper limit and .10 as the lower limit to obtain estimates of applicant pool size. With a selection ratio of .40, and 68 people on the job, the size of the applicant pool would be 170. Similarly with a selection ratio of .10 and 68 people on the job, the size of the applicant pool would be 680. These

Ns of 170 and 680 were used as very rough estimates for choosing values of Ns at which to compare the two methods of assessing adverse impact. In order to compare the two rules under both common and extreme conditions, the following Ns were used: 75, 150, 225, 350, 700, 1500.

Proportion Minority

The proportion minority (Promin) is the proportion of the applicant pool who are minority group members. The two methods of assessing adverse impact were compared at a proportion minority of .03, and at values ranging from .05 to .50 in increments of .05. The proportion of the applicant pool which is composed of minority group members can vary widely from location to location and from job to job within the same location. The proportion minority will also differ depending on which minority group is considered. The range of variation of proportion minority is clearly too great to allow a full discussion here. In discussing the two methods of assessing adverse impact, the proportions of hispanics (.05), blacks (.10), and women (.40) in the civilian labor force will be emphasized (Employment and Training Report of the President, 1978).

Comparison of the Two Rules

Two sets of tables were prepared to show the results of calculations comparing the application of the two rules for the assessment of adverse impact. In each set of tables, the application of the two rules was compared for all 660 combinations of N, MajSR, and Promin.

In the first set of tables (Tables 1A through 6A), the ratio of the minority selection ratio to the majority selection ratio (the Adverse Impact Ratio, AIR) was preset to a value of .79. This value is the highest AIR value which would define adverse impact by the 80% rule.

With the AIR value set at .79, chi-square values were calculated for each of the 660 combinations of N, MajSR, and Promin.

As an example of this phase of the analysis, consider the situation where $N = 700$, $\text{MajSR} = .40$, and $\text{Promin} = .15$. In this situation, the number of minority group applicants is 105, and the proportion of those selected is .316 or 33.18. Thus, the remainder of the minority group applicants (71.82) were rejected. By similar calculations, the number of majority group applicants is 595, of whom 238 are selected and 357 are rejected. Chi-square (with Yates' correction) for these data is 2.31.

Based on several court cases (e.g., *Castenada v. Partida*, 1977), the .05 level has been the accepted level of significance in adverse impact legislation. In the second set of tables (Tables 1B through 6B), chi-square was set at approximately 3.84 ($p < .05$) which is the lowest value of chi-square indicating adverse impact by the statistical significance method. For the various combinations of N, MajSR, and Promin the resulting AIR values were determined. In this phase of the analysis, the desired AIR value was found by varying AIR until a chi-square value of approximately 3.84 was reached in the given situation.

While other approaches to assessing the statistical significance of the differences between the two selection ratios are available, chi-square was used because it is convenient and easy to calculate, and because some courts have accepted its use in analyses of adverse impact (e.g., *Chance v. Board of Examiner*, 1972; *Jones v. New York City Human Resources Admin.*, 1975, p. 6752). Yates' correction was applied to the calculation of all chi-squares. With large expected frequencies in

every cell, Yates' correction will have a negligible effect on chi-square (Walker & Lev, 1953). However, with small expected cell frequencies, Yates' correction provides a better estimate of chi-square (Walker & Lev, 1953). Fisher's exact test was not used, because the sample sizes in the present study create problems for the factoria' computations involved in this test (Hays, 1963; Walker & Lev, 1953).

Results and Discussion

An important initial concern is the amount of agreement between the 80% rule and statistical significance as assessments of adverse impact. The two methods can be compared in relation to the decision of adverse impact/no adverse impact, or by examining the degree of discrepancy from just adverse impact. Comparing the two methods in relation to a dichotomous decision is somewhat misleading. For example, with a preset chi-square value of 3.84, $N = 225$, $\text{Promin} = .05$ and $\text{MajSR} = .40$, the resulting $\text{AIR} = .15$. (See Table 3B.) Thus, under these conditions both methods would indicate adverse impact. Although on the surface the two methods appear to be functioning similarly, a closer examination indicates this is not the case. While a chi-square of approximately 3.84 merely indicates just adverse impact under these conditions, a conclusion of just adverse impact by the 80% rule is not justified since $\text{AIR} = .15$. This AIR varies a great deal from the AIR expected to be found at just adverse impact (i.e., $\text{AIR} = .79$).

The only conditions where the two methods absolutely agree is where they both indicate just adverse impact. These

conditions are along the heavy lines in the two sets of Tables.² (See Tables 1A - 6A and 1B - 6B). As can be seen, there are relatively few conditions where the two methods lead to the same conclusion. In choosing one method over the other, the weaknesses of each need to be considered.

Insert Tables 1A-6A and Tables 1B-6B about here

The 80% Rule

A major difficulty with the 80% rule as a method for assessing adverse impact is that the employer may be cited for adverse impact when in fact chance differences have occurred in hiring minority and majority applicants as is evident by examining Tables 1A-6A. In all 660 situations represented in Tables 1A-6A the AIR has been set at .79 which is just adverse impact by the 80% rule. Below the solid line in each of these Tables, all the corresponding chi-square values are non-significant, thus representing chance differences in the hiring of minority and majority applicants.³ (No line appears in Table 1A since the highest chi-square value in the table was not statistically significant).

Examining civilian labor forces similar to those of hispanics (Promin = .05), and blacks (Promin = .10) (Employment and Training Report of the President, 1978) many situations may arise where adverse impact would be claimed on the basis of chance differences. Specifically, for proportion minorities equal to .05 and .10, nonsignificant chi-squares would be found when the 80% rule indicated just adverse impact under the

following conditions: applicant pool N's ranging from 75 through 1500 with majority selection ratios ranging from .10 through .40 (see Tables 1A - 6A). Thus, claiming adverse impact where in fact chance differences have occurred is apparent under these fairly typical conditions.

Where nonsignificant chi-square values are found, statistical significance can be reached by obtaining larger applicant pool N's. For example, when $AIR = .79$, $Promin = .05$, and $MajSR = .10$, an applicant pool N of 17311 is necessary to obtain statistical significance. Applicant pools of this size may be found in police and firefighter selection in large cities, however, they typically are not dealt with by personnel managers.

Relatively large N's are also needed to achieve statistical significance even when higher proportion minorities and majority selection ratios are used. For example, in the situation where $AIR = .79$, $Promin = .40$, and $MajSR = .40$, an applicant pool N of 575 is necessary to obtain statistical significance. Obviously, an applicant pool of this size reaches more realistic expectations, but it is still fairly large. Even with fairly large applicant pools, using the 80% rule to assess adverse impact may result in chance differences not only in situations with small majority selection ratios and proportion minorities, but also in situations with fairly moderate majority selection ratios and proportion minorities.

Besides increasing the applicant pool N, statistical significance can also be reached in the conditions below the solid lines by reducing the AIR value. For example, examining the situation represented in Table 3B where $N = 225$, $Promin = .10$, and $MajSR = .30$,

the resulting AIR value needed to reach statistical significance is .27. So in this situation, claiming adverse impact with AIR values between .79 and .28 would be doing so on the basis of chance differences in the hiring of minority and majority applicants. The data in the tables indicate that under some fairly typical conditions, statistical significance is not reached until AIR values much lower than .79 are achieved.

A second drawback of the 80% rule is that it varies solely as a function of the majority group selection ratio. It is not sensitive to variations in N, and proportion minority. For example, suppose that the employer was using a selection ratio of .90 for the majority group. With the 80% rule, adverse impact would be indicated when the minority selection ratio dropped below .72, no matter what the values of N or proportion minority. If a "rule of thumb" is to be used to assess adverse impact, it should take into account situational parameters such as N and proportion minority. Perhaps a single "rule of thumb" such as the 80% rule is not appropriate in all situations.

Chi-Square and Adverse Impact

The asterisks in Tables 1B-6B indicate conditions in which statistical significance does not occur, i.e., conditions where a chi-square value greater than 3.84 cannot be obtained. Thus, under these conditions hiring zero minorities would not produce a statistically significant result with chi-square. The asterisked area is more pronounced under conditions of smaller N's, smaller proportion minority, and smaller majority selection ratios.

Obviously, statistical significance with chi-square is not reached under some reasonably common circumstances. To illustrate

this point, two examples will be given. With a proportion minority similar to that of hispanics in the civilian work force (approximately .05) statistical significance is not reached under the following circumstances: (a) N of 150 and majority selection ratio .40; (b) N of 225 and majority selection ratio .30; (c) N of 350 and majority selection ratio .20; (d) N of 700 and majority selection ratio .10. With a proportion minority similar to that of women in the civilian labor force (approximately .40) (Employment and Training Report of the President, 1978) the problem is not as pronounced, but it still exists. With this proportion minority, statistical significance is not reached under the following circumstances: N of 75 and majority selection ratio .10; N of 150 and majority selection ratio .05; N of 225 and majority selection ratio .05.

Under the circumstances where a significant chi-square cannot be obtained, prosecuting the company for selecting zero minorities is not sensible, since this result is a chance occurrence. However, the company may covertly and consciously refuse to hire applicants on the basis of race or sex in such situations and could not be prosecuted for this action on the grounds of a chi-square analysis. Such action on the part of the company would be clearly against Title VII of the Civil Rights Act. Perhaps under the circumstances where a chi-square of 3.84 cannot be reached, other approaches to the question of adverse impact may be more appropriate. One possible alternative approach to determining whether a group or individual has been treated unfairly is the application of Social Judgment Technology (e.g., Maniscalco, Doherty, & Ullman, 1980). Another approach would be the

use of employee testimony.

Besides the problem that a significant chi-square value cannot be obtained under some plausible circumstances, a second difficulty exists with the use of chi-square to assess adverse impact. As Hays (1963, p. 333) has pointed out, when the sample size is very large, statistical significance may be found even when there are trivial differences among the variables. In the case of chi-square, when there are large majority selection ratios, large proportion minorities, and large N s, statistical significance may result indicating adverse impact even when the minority selection ratio is over 90% of the majority selection ratio.

For example, as can be seen in Table 4B, with an N of 350, a majority selection ratio of .90, and a proportion minority of .30, the AIR is .91. With an N of 700, a majority selection ratio of .80, and a proportion minority of .25, the AIR is .91 (see Table 5B). In examining Table 6B, when the N is 1500, the majority selection ratio is .60, and the proportion minority is .30 the resulting AIR is .91.

Although the results under conditions such as these in the previous examples may be statistically significant, they may not be practically significant (Fleiss, 1969). Perhaps some rule of thumb for practical significance should be invoked under such conditions. This problem may not be greatly widespread, however, since combinations of large majority selection ratios, large proportion minorities, and large N s are not highly typical.

In summary, there are very few situations where the two methods of assessing adverse impact agree, and problems exist with both methods. More attention needs to be focused on choosing an appropri-

ate assessment of adverse impact considering these shortcomings.

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Footnotes

²The heavy lines on the corresponding "A" and "B" Tables are somewhat different because of rounding errors in the calculations. Further, the reader should note that the heavy line in each table may be in different positions for different preset values of chi-square and AIR. As indicated previously, chi-square was set at approximately 3.84 and AIR at .79; varying these preset values would probably result in different situations of agreement. Although this point is extremely important for interpretation of the tables, the fact remains that there are few conditions where the two rules absolutely agree.

³However, under some of these conditions significant chi-squares cannot be obtained even when the selection rate for the minority group is equal to zero. These conditions are indicated by asterisks in the "B" Tables and will be discussed in more detail later in the paper.

Table 1A

N=75 AIR=.79

MajSR	MinSR	Promin=	.03	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
.90	.7110		.04	.09	.85	1.60	2.19	2.64	2.95	3.14	3.23	3.23	3.15
.80	.6320		.00	.02	.35	.73	1.07	1.35	1.56	1.71	1.81	1.85	1.84
.70	.5530		.00	.00	.17	.39	.60	.78	.93	1.04	1.11	1.15	1.16
.60	.4740		.00	.00	.08	.22	.35	.47	.57	.65	.70	.73	.74
.50	.3950		.00	.00	.03	.11	.19	.27	.34	.39	.43	.46	.47
.40	.3160		.00	.00	.00	.04	.09	.14	.18	.22	.25	.26	.27
.30	.2370		.00	.00	.00	.01	.03	.05	.08	.10	.11	.12	.13
.20	.1580		.00	.00	.00	.00	.00	.00	.01	.02	.02	.03	.03
.10	.0790		.00	.00	.00	.00	.00	.00	.00	.01	.01	.01	.01
.05	.0395		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

Note: Entries in Tables 1A-6A are chi-square values. Heavy lines were drawn to separate significant chi-square ($p < .05$) from nonsignificant chi-square values.

Table 2A

N=150 AIR=.79

MajSR	MinSR	Promin=	.03	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
.90	.7110		.26	1.03	2.98	4.53	5.71	6.57	7.15	7.49	7.63	7.59	7.39
.80	.6320		.08	.41	1.36	2.21	2.90	3.46	3.88	4.18	4.37	4.44	4.41
.70	.5530		.02	.20	.76	1.28	1.73	2.10	2.40	2.62	2.77	2.85	2.86
.60	.4740		.00	.04	.44	.78	1.09	1.34	1.55	1.71	1.83	1.90	1.92
.50	.3950		.00	.04	.25	.48	.68	.86	1.01	1.12	1.20	1.26	1.27
.40	.3160		.00	.01	.13	.27	.41	.52	.62	.70	.76	.80	.82
.30	.2370		.00	.00	.04	.13	.21	.28	.35	.40	.44	.46	.47
.20	.1580		.00	.00	.02	.03	.07	.11	.14	.17	.19	.20	.21
.10	.0790		.00	.00	.00	.01	.00	.00	.01	.02	.02	.03	.03
.05	.0395		.00	.00	.00	.00	.00	.00	.00	.01	.01	.01	.01

Table 3A

N=225 AIR=.79

MajSR	MinSR	Promin=	.03	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
.90	.7110		.88	2.22	5.22	7.55	9.29	10.54	11.38	11.87	12.05	11.97	11.65
.80	.6320		.34	.95	2.45	3.73	4.78	5.61	6.24	6.68	6.95	7.05	7.00
.70	.5530		.15	.50	1.41	2.21	2.89	3.45	3.90	4.23	4.45	4.57	4.59
.60	.4740		.07	.28	.86	1.39	1.85	2.24	2.56	2.80	2.97	3.07	3.10
.50	.3950		.02	.15	.57	.88	1.20	1.47	1.69	1.87	1.99	2.07	2.10
.40	.3160		.00	.06	.30	.54	.75	.93	1.09	1.21	1.30	1.36	1.38
.30	.2370		.00	.01	.14	.29	.42	.54	.64	.72	.78	.82	.84
.20	.1580		.00	.00	.04	.11	.18	.25	.31	.35	.39	.41	.42
.10	.0790		.00	.00	.00	.00	.02	.04	.06	.08	.09	.10	.10
.05	.0395		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

Table 4A

N=350 AIR=.79

MajSR	MinSR	Promin=	.03	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
.90	.7110		2.11	4.31	9.01	12.61	15.28	17.19	18.46	19.19	19.44	19.28	18.76
.80	.6320		.89	1.92	4.29	6.29	7.92	9.20	10.18	10.86	11.27	11.42	11.33
.70	.5530		.46	1.07	2.51	3.77	4.83	5.71	6.40	6.92	7.26	7.45	7.46
.60	.4740		.25	.63	1.58	2.42	3.14	3.75	4.24	4.62	4.89	5.05	5.09
.50	.3950		.13	.37	1.00	1.57	2.07	2.50	2.85	3.12	3.32	3.44	3.49
.40	.3160		.05	.20	.61	1.00	1.34	1.63	1.87	2.06	2.20	2.30	2.33
.30	.2370		.01	.09	.34	.58	.80	.99	1.15	1.28	1.37	1.43	1.46
.20	.1580		.00	.02	.14	.27	.40	.51	.60	.67	.73	.77	.78
.10	.0790		.00	.02	.01	.05	.09	.14	.17	.21	.23	.24	.25
.05	.0395		.00	.00	.00	.00	.00	.01	.02	.03	.04	.05	.05

Table 5A

N=700 AIR=.79

MajSR	MinSR	Promin=	.03	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
.90	.7110		5.83	10.32	19.72	26.83	32.10	35.85	38.32	39.71	40.16	39.79	38.70
.80	.6320		2.57	4.72	9.51	13.49	16.73	19.29	21.22	22.56	23.37	23.66	23.47
.70	.5530		1.44	2.72	5.15	8.17	10.30	12.05	13.43	14.46	15.15	15.50	15.54
.60	.4740		.87	1.70	3.62	5.32	6.77	7.99	8.98	9.74	10.27	10.58	10.67
.50	.3950		.53	1.08	2.38	3.53	4.54	5.39	6.09	6.65	7.04	7.29	7.39
.40	.3160		.30	.66	1.53	2.31	3.00	3.59	4.08	4.64	4.75	4.93	5.01
.30	.2370		.14	.37	.92	1.43	1.87	2.26	2.58	2.84	3.04	3.16	3.22
.20	.158		.04	.15	.46	.76	1.02	1.25	1.44	1.59	1.71	1.79	1.83
.10	.0790		.00	.01	.12	.24	.35	.45	.54	.60	.66	.69	.71
.05	.0395		.00	.00	.01	.05	.09	.13	.17	.20	.22	.23	.24

Table 6A

N=1500 AIR=.79

MajSR	MinSR	Promin=	.03	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
.90	.7110		14.56	24.21	44.25	59.39	70.58	78.51	83.73	88.63	87.53	86.69	84.30
.80	.6320		6.56	11.19	21.46	29.98	36.90	42.30	46.48	49.34	51.04	51.65	51.23
.70	.5530		3.79	6.56	12.85	18.26	22.82	26.56	29.51	31.71	33.18	33.94	34.01
.60	.4740		2.38	4.18	8.33	11.96	15.08	17.69	19.81	21.44	22.58	23.25	23.44
.50	.3950		1.53	2.74	5.54	8.03	10.19	12.02	13.53	14.71	15.57	16.01	16.30
.40	.3160		.96	1.77	3.65	5.34	6.81	8.08	9.13	9.97	10.58	10.98	11.15
.30	.2370		.55	1.07	2.29	3.38	4.35	5.18	5.88	6.44	6.86	7.13	7.26
.20	.1580		.26	.55	1.26	1.90	2.47	2.96	3.38	3.71	3.97	4.14	4.22
.10	.0790		.04	.16	.46	.74	.99	1.21	1.40	1.55	1.16	1.74	1.78
.05	.0395		.00	.02	.13	.26	.37	.47	.56	.63	.68	.72	.74

Table 1B

N=75 Chi-square = 3.84 ($p < .05$)

MajSR	Promin=	.03	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
.90		.27	.46	.63	.70	.73	.75	.76	.77	.77	.77	.77
.80		.02	.28	.50	.59	.64	.67	.68	.70	.70	.70	.70
.70		*	.10	.38	.49	.55	.59	.61	.63	.64	.64	.64
.60		*	*	.25	.39	.46	.51	.54	.56	.57	.58	.58
.50		*	*	.10	.26	.36	.41	.45	.48	.49	.50	.51
.40		*	*	*	.11	.23	.30	.34	.38	.40	.41	.42
.30		*	*	*	*	.05	.14	.20	.25	.28	.30	.31
.20		*	*	*	*	*	*	*	.05	.09	.12	.15
.10		*	*	*	*	*	*	*	*	*	*	*
.05		*	*	*	*	*	*	*	*	*	*	*

Note: Entries in Tables 1B-6B are AIR values. Heavy lines are drawn to separate AIR values greater than .80 from those less than .80. Asterisks represent conditions where a chi-square value greater than 3.84 cannot be obtained.

Table 2B

N=150 Chi-square = 3.84 ($p < .05$)

MajSR	Promin=	.03	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
.90		.54	.66	.77	.81	.83	.84	.85	.85	.85	.85	.85
.80		.37	.53	.67	.73	.76	.78	.79	.80	.80	.80	.80
.70		.21	.41	.59	.66	.70	.72	.74	.75	.76	.76	.76
.60		.04	.28	.50	.59	.63	.66	.68	.70	.71	.71	.71
.50		*	.13	.39	.50	.56	.60	.62	.64	.65	.66	.66
.40		*	*	.26	.40	.47	.51	.55	.57	.58	.59	.59
.30		*	*	.08	.25	.39	.40	.44	.47	.49	.50	.51
.20		*	*	*	.03	.15	.23	.29	.32	.35	.37	.38
.10		*	*	*	*	*	*	*	.03	.07	.10	.13
.05		*	*	*	*	*	*	*	*	*	*	*

Table 3B

N=225 Chi-square = 3.84 ($p < .05$)

MajSR	Promin=	.03	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
.90		.65	.74	.82	.85	.86	.87	.88	.88	.89	.89	.89
.80		.61	.63	.74	.79	.81	.83	.83	.84	.84	.85	.85
.70		.38	.54	.67	.73	.76	.78	.79	.80	.80	.81	.81
.60		.24	.43	.60	.67	.71	.73	.75	.76	.76	.77	.77
.50		.08	.31	.52	.60	.65	.68	.69	.71	.72	.72	.72
.40		*	.15	.41	.51	.57	.61	.63	.65	.66	.67	.67
.30		*	*	.27	.40	.47	.52	.55	.57	.58	.59	.60
.20		*	*	.04	.22	.31	.38	.42	.45	.47	.48	.49
.10		*	*	*	*	*	.08	.15	.20	.23	.26	.27
.05		*	*	*	*	*	*	*	*	*	*	.00

Table 4B

N=350 Chi-square = 3.84 ($p < .05$)

MajSR	Promin=	.03	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
.90		.73	.80	.86	.88	.90	.90	.91	.91	.91	.91	.91
.80		.63	.72	.80	.83	.85	.86	.87	.88	.88	.88	.88
.70		.52	.64	.74	.79	.81	.83	.84	.84	.85	.85	.85
.60		.41	.56	.69	.74	.77	.79	.80	.81	.81	.82	.82
.50		.29	.46	.62	.68	.72	.74	.76	.77	.73	.78	.78
.40		.13	.34	.54	.62	.66	.69	.71	.72	.73	.73	.74
.30		*	.17	.42	.53	.58	.62	.64	.66	.67	.67	.68
.20		*	*	.24	.38	.45	.50	.53	.56	.57	.58	.59
.10		*	*	*	.07	.19	.26	.31	.35	.38	.40	.41
.05		*	*	*	*	*	.25	.02	.08	.12	.15	.18

Table 5B

N=700 Chi-square = 3.84 ($p < .05$)

MajSR	Promin=	.03	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
.90		.84	.87	.91	.92	.93	.94	.94	.94	.94	.94	.94
.80		.75	.81	.86	.89	.90	.91	.91	.92	.92	.92	.92
.70		.68	.75	.83	.85	.87	.88	.89	.89	.89	.90	.90
.60		.60	.70	.78	.82	.84	.85	.86	.87	.87	.87	.87
.50		.52	.63	.74	.78	.81	.82	.83	.84	.84	.85	.85
.40		.41	.55	.68	.73	.76	.78	.80	.80	.81	.81	.81
.30		.26	.43	.60	.67	.71	.73	.75	.76	.77	.77	.77
.20		.02	.25	.48	.57	.62	.65	.67	.69	.70	.70	.71
.10		*	*	.21	.35	.43	.48	.51	.54	.55	.57	.57
.05		*	*	*	.05	.17	.25	.30	.34	.37	.39	.40

Table 6B

N=1500 Chi-square = 3.84 ($p < .05$)

MajSR	Promin=	.03	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
.90		.89	.91	.94	.95	.95	.96	.96	.96	.96	.96	.96
.80		.84	.87	.91	.92	.93	.94	.94	.94	.95	.95	.95
.70		.79	.84	.88	.90	.91	.92	.92	.93	.93	.93	.93
.60		.74	.80	.86	.88	.89	.90	.91	.91	.91	.91	.91
.50		.68	.75	.82	.85	.87	.88	.89	.89	.89	.90	.90
.40		.61	.70	.78	.82	.84	.85	.86	.87	.87	.87	.87
.30		.51	.62	.73	.78	.80	.82	.83	.84	.84	.84	.84
.20		.35	.51	.65	.71	.74	.76	.78	.79	.79	.80	.80
.10		.01	.25	.47	.56	.61	.65	.67	.68	.69	.70	.70
.05		*	*	.22	.36	.44	.49	.52	.54	.56	.57	.58